REMARKS

Applicants have amended claims 1, 4, 5, 8 and 9 and withdrawn claims 8 to 10. Applicants respectfully request reconsideration in view of the amendments and the following remarks.

Applicants confirm the election of Invention I (claims 1 to 7) and have placed the Invention II claims on withdrawn status. Since the method claims of Invention II contain the composition limitations of claim 1, Applicants respectfully request reconsideration of the restriction requirement upon the allowance of claims 1 to 7.

Applicants amended claims 1, 4, 5, 8 and 9 to limit the pH range to less than 4, from less than or equal to 4. The specification at paragraph 30, line 1, provides a basis for the limitation. In addition, claims 1, 5, 8 and 9 include the term "water soluble" carboxylic acid polymer. The specification at paragraph 13, lines 1 to 2 provides a basis for the limitation. Claims 5 and 9 also contain a further limitation to the specific acids listed in paragraph 29. Furthermore, the amendment adds the oxidizer limitation of claim 1 into claim 8 and removes the weight percent description from claim 9. Applicants respectfully submit that these amendments enter no new matter.

The action rejects claims 1 to 7 under 35 U.S.C. § 103(a) as being unpatentable over Sun et al. (US Pat. No. 6,709,316) in view of Yano et al.(US Pat. No. 6,375,5645). The reference of Sun et al. does not disclose a second step barrier removal slurry that operates at a pH below 4. In fact the prophetic-type Example of Sun et al. operates at a basic pH of 8 to 12. This teaches away from the acidic barrier slurry of the invention. In addition, Sun et al. fail to disclose a pH less than 4 adjusted with an inorganic acid. The Yano et al. reference teaches the use of a malic acid monomer to form an abrasive particle. Applicants' amended claims cover a water soluble carboxylic acid polymer having at least one repeat unit of the polymer comprising at least two

carboxylic acid functionalities. These carboxylic acid polymers can limit dielectric erosion without adversely impacting barrier removal rate. Thus, since Sun et al. teaches away from using a pH less than 4, does not disclose use of an inorganic acid to adjust the pH and Yano et al. do not disclose the claimed water soluble polymer, Applicants respectfully submit that the combined references fail to disclose or suggest claims 1 to 7, as amended.

With respect to claims 2 and 3, Sun et al. disclose a chelating agent, but fail to disclose a water soluble carboxylic acid polymer having at least one repeat unit of the polymer comprising at least two carboxylic acid functionalities. These polymers can limit dielectric erosion without detrimentally impacting tantalum removal rate. Furthermore, the polymer particle disclosure of Yano et al. fails to disclose the claimed water soluble polymers.

With respect to claim 4, Sun et al. at Col. 7, lines 53 to 59 do disclose a pH range of 2.5 to 11. But this range is for the first step slurry that removes copper. The pH range for the second step slurry that removes barrier is 4 to 12—see top of column 9. Applicants have amended the range to no longer overlap the range at a pH of 4.

With respect to claim 5, Sun et al. fail to teach the pH range for a barrier slurry, teaches away by having the preferred barrier slurry operate with a basic pH; and the Yano et al. reference teaches a polymeric particle, not a water-soluble carboxylic acid polymer having at least one repeat unit of the polymer comprising at least two carboxylic acid functionalities.

With respect to claims 6 and 7, please refer to the above arguments to claims 2 and 3.

WO 01/17006 appears equivalent to EP 1223609 ('609) submitted in today's Information Disclosure Statement. The EP '609 reference does disclose the use of water soluble polymalic acid. But this reference discloses a first step copper solution and not a selective-second step solution for removing tantalum. In addition, the reference fails to disclose a low pH solution adjusted with an inorganic acid for accelerated tantalum removal.

Sun et al. in US Pat. No. 6,858,540, disclose a selective barrier slurry that operates with an alkaline pH.

Applicants note the 1993 passage from the Handbook of Multilevel Metallization for Integrated Circuits –Materials, Technology, and Applications reflects a general teaching in the polishing art.

US Pat. No. 6,194,366, to Naghshineh et al. discloses a cleaning solution not related to the current invention.

US Pat. No. 6,447,371 to Kaufman et al. discloses some barrier formulations in Table 4. But these formulations are not within claimed the pH range, lack an inorganic acid for adjusting pH and do not disclose a water-soluble carboxylic acid polymer having at least one repeat unit of the polymer comprising at least two carboxylic acid functionalities.

US Pat. No. 5,658,993 to Dezinger et al. disclose a method of manufacturing copolymers useful for cleaning.

Applicants respectfully submit that the amended claims are in proper form for allowance and respectfully request reconsideration. If a telephone call would expedite prosecution, please call me at 302 283-2136.

Respectfully submitted,

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